

UNCLASSIFIED

AD NUMBER	
AD042889	
CLASSIFICATION CHANGES	
TO:	unclassified
FROM:	confidential
LIMITATION CHANGES	
TO:	Approved for public release; distribution is unlimited.
FROM:	Distribution authorized to DoD only; Administrative/Operational Use; FEB 1954. Other requests shall be referred to Bureau of Ships, Washington, DC 20350.
AUTHORITY	
BUSHIPS ltr dtd 1 Apr 1968; BUSHIPS ltr dtd 1 Apr 1968	

THIS PAGE IS UNCLASSIFIED

# Armed Services Technical Information Agency

Because of our limited supply, you are requested to return this copy WHEN IT HAS SERVED YOUR PURPOSE so that it may be made available to other requesters. Your cooperation will be appreciated.

AD

42889

NOTICE: WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE U. S. GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

Reproduced by  
DOCUMENT SERVICE CENTER  
KNOTT BUILDING, DAYTON, 2, OHIO

CONFIDENTIAL

AD No. 42-889  
ASTIA FILE COPY

CONFIDENTIAL

FURTHER DISSEMINATION IS AUTHORIZED ONLY TO  
MILITARY AGENCIES.

PROGRESS REPORT NO. 21

TRAVELING-WAVE TUBES

Index No. 111613, Task 9  
Contract No. 603-57354  
February 1954

P.D  
4-28-889

This Document contains information affecting  
the National Defense of the United States  
within the meaning of the Espionage Laws,  
Title 18 - U.S.C. - Sections 793 and 794. Its  
transmission or the revelation of its contents  
in any manner to an unauthorized person is  
prohibited by law.

CASES: 8-18-74  
8-18-75

FEDERAL TELECOMMUNICATION LABORATORIES,  
a division of International Telephone and Telegraph Corporation

500 WASHINGTON AVENUE  
MUTLEY 10, NEW JERSEY

Prepared By R. H. GEIGER  
Approved By J. H. BRYANT  
A. K. WING, JR.

COPY NO. 5  
March 1954

DEPARTMENT OF THE NAVY, BUREAU OF SHIPS  
WASHINGTON, D.C.

CONFIDENTIAL

4001432

54 11 56099

CONFIDENTIAL

PROGRESS REPORT NO. 21

TRAVELING-WAVE TUBES

Index No 111613 Task 9  
Contract N0bsr-57354  
February 1954

This Document contains information affecting  
the National Defense of the United States  
within the meaning of the Espionage Laws  
Title 18 U.S.C...Sections 793 and 794. Its  
transmission or the revelation of its contents  
in any manner to an unauthorized person is  
prohibited by law.

CASES 3 13 74  
3-13 75

F E D E R A L T E L E C O M M U N I C A T I O N L A B O R A T O R I E S  
a division of International Telephone and Telegraph Corporation

500 WASHINGTON AVENUE  
MUTLEY 10, NEW JERSEY

Prepared By R. H. GRIGER  
Approved By J. H. BRYANT  
A. K. WING, JR.

COPY NO. 5  
March 1954

DEPARTMENT OF THE NAVY, BUREAU OF SHIPS  
WASHINGTON, D.C.

CONFIDENTIAL

54 AA 56099

CONFIDENTIAL

PROGRESS REPORT NO. 21

TRAVELING-WAVE TUBES

Driver Tube

During the past interval Tubes No. 111 through No. 115 were constructed and tested. Tube No. 111 had a power output of 456 watts with 29 db gain. At lower than synchronous voltage as much as 300 watts of oscillation power were observed. In Tube No. 112 attempts were made to eliminate this oscillation. A change in the mechanical construction of the tube was made whereby the input and output matching sections were completely isolated. This also reduced the surface area of the vacuum wall. With a reduced area of metal exposed to vacuum, the exhaust operation is improved. In Tube No. 112 a short developed in the electron gun. However, it was possible to make some limited r-f measurements. A maximum of approximately 300 watts of output power was observed with an oscillation power of less than 20 watts. This tube was rebuilt as Tube No. 114 using a new electron gun. This time 500 to 800 watts of output power were observed with an oscillation power in the order of 100 watts. It is believed that the oscillation is of the backward-wave type. Tube No. 113 was placed in a special exhaust station where it was possible to make d-c and r-f measurements during evacuation. Conclusive tests were not possible, since the loss was destroyed by an extreme amount of driver power.

Tests made on the last four tubes indicated that some modifications were necessary in the electron-gun design. It is believed that an improvement here would help eliminate the oscillation problem and increase the output power.

Output Tube

Experimental tubes Nos. 6 and 7 were completed and tested during the past month. A second Pierce-type gun has been constructed, and preparations are

CONFIDENTIAL

-1-

CONFIDENTIAL

being made for exhausting and testing. Studies of slow-wave structures were continued with the demountable tube.

Program for the Next Interval

During the next interval improvement will be made in the electron-gun design of the driver tube with several tubes then being built and tested. The Pierce-type gun for the output tube will be exhausted and tested, and further mode studies of slow-wave structures will be conducted.

CONFIDENTIAL

-2-

# Armed Services Technical Information Agency

Because of our limited supply, you are requested to return this copy WHEN IT HAS SERVED YOUR PURPOSE so that it may be made available to other requesters. Your cooperation will be appreciated.

AD

42889

NOTICE: WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE U. S. GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

Reproduced by  
DOCUMENT SERVICE CENTER  
KNOTT BUILDING, DAYTON, 2, OHIO

CONFIDENTIAL